WHAT IS CLAIMED IS:

1. A counterflow plate-type evaporative heat exchanger, comprising:

a plurality of parallel plates having side edges and top and bottom edges, wherein said parallel plate pairs define alternating dry and wet passages;

a water reservoir disposed below said plates connected to a water distribution system disposed above said plates, and a pump that circulates water from said reservoir to said distribution system, and wherein said water flows downward through said wet passages, to wet the surfaces of the plates forming said wet passages, into said reservoir;

a first airstream that flows into upper side openings of said dry passages and downward through said dry passages; and

a second airstream that flows from an area located below said plates and above said reservoir, into open bottom edges of said wet passages and upward through said wet passages before exiting through open top edges of said wet passages, so that said second airstream is directly evaporatively cooled, and thereby indirectly evaporatively cools said first airstream.

2. The evaporative heat exchanger of claim 1, wherein said dry passages are open along said bottom edges and all, or a portion, of said first airstream exiting the bottom of said dry passages becomes all or a portion of said second airstream.

3. The evaporative heat exchanger of claim 2, wherein said dry passages have lower openings along the side edges, and wherein a portion of said first airstream exits through said lower side openings, and the remainder of said first airstream exits at the bottom of said dry passages to become a portion of said second airstream, and wherein the remainder of said second airstream is drawn from a building interior.

4. The evaporative heat exchanger of claim 2, wherein all of said first airstream flowing from the bottom of said dry passages becomes all of said second airstream flowing upward into said wet passages.

5. The evaporative heat exchanger of claim 1, wherein said dry passages are closed along said bottom edges, have openings along lower side edges, and all of said first airstream enters through said dry passage upper side edge openings and exits through lower side edge openings in said dry passages.

6. The evaporative heat exchanger of claim 5, wherein none of said second airstream is drawn directly from the outdoors.

7. The evaporative heat exchanger of claim 6, wherein said first airstream becomes ventilation air for a building after exiting said dry passages, and said second airstream comprises exhaust air from said building.

8. The evaporative heat exchanger of claim 1, wherein said water from said reservoir gains heat by passing through a second heat exchanger before entering said distribution system, and is then evaporatively cooled as it flows downward through said wet passages.

9. The evaporative heat exchanger of claim 1, wherein each of said dry passages is enclosed by opposed parallel plates formed from a single sheet with a 180 degree fold, and said fold is positioned to be the closed top edge of said dry passage.

10. The evaporative heat exchanger of claim 1, wherein the side edges of said plates are formed to close said dry passages except where required to be open for entry and exit of said first airstream, while maintaining a desired spacing between said parallel plate sides.

11. The evaporative heat exchanger of claim 5, wherein the bottom edges of said plate sides are formed to close said dry passage bottom edges.

12. The evaporative heat exchanger of claim 1, wherein said parallel plates include at least one formed projection inboard of said edges to maintain a desired spacing between said parallel plates.

13. The evaporative heat exchanger of claim 12, wherein said parallel plates include interlocking edge projections that hold said plates in parallel position to form a dry passage plate pair.

14. The evaporative heat exchanger of claim 13, wherein said parallel plates include at least one formed projection inboard of said edges to maintain a desired spacing across said wet passages between said dry passage plates.

15. The evaporative heat exchanger of claim 14, wherein said parallel plates include interlocking edge projections that hold adjacent dry passage plate pairs together in parallel position.

16. The evaporative heat exchanger of claim 4, further comprising at least one air mover disposed above said plates to create a negative pressure along the open top edges of said wet passages that causes air to enter said upper side openings of said dry passages and flow downward,exit said dry passages at the open bottom edges and enter said wet passages, andflow upward through the wet passages to exit through said at least one air mover.

17. The evaporative heat exchanger of claim 5, further comprising at least one first air mover that creates a positive pressure along the upper side openings of said dry passagest causing said first airstream to enter said upper side edge openings of said dry passages and flow downward to exit through said dry passage lower side edge openings, and by at least one second air mover located above said plates causing said second airstream to flow into and upward through said wet passages.

18. The evaporative heat exchanger of claim 5, further comprising at least one first air mover that creates a negative pressure along said dry passage lower side openings that causes said first airstream to enter said upper side openings of said dry passages and flow downward to exit through lower side openings, and at least one second air mover located above said plates causing said second airstream to flow into and upward through said wet passages.

19. The evaporative heat exchanger of claim 3, further comprising at least one first air mover that creates a positive pressure along said dry passage upper side openings causing said first airstream to enter said upper side openings of said dry passages and flow downward, with said portion of said first airstream exiting through said lower side edge openings, and by at least one second air mover located above said plates causing said second airstream, including said remainder of said first airstream, to flow into and upward through said wet passages.

20. The evaporative heat exchanger of claim 3, further comprising at least one first air mover that creates a negative pressure along said dry passage lower side edge openings causing said first airstream to enter said upper sideopenings of said dry passages and flow downward, with said portion of said first airstream exiting through said lower side edge openings, and by at least one second air mover located above said plates causing said second airstream, including said remainder of said first airstream, to flow into and upward through said wet passages.

21. The evaporative heat exchanger of claim 19, wherein the at least one air mover operates with variable speed control to maintain equal flow rates for said first and second airstreams.

22. The evaporative heat exchanger of claim 19, wherein at the least one of said air mover operates with variable speed control to maintain a desired fixed flow rate for said first airstream under a range of pressure conditions.

23. The evaporative heat exchanger of claim 19, further comprising at least one first pressure sensor located at said dry passage lower side openings and at least one second

pressure sensor located at the bottom edge of said wet passage, and wherein a positive pressure differential between said first and second sensors determines a variable speed of either said first air mover or said second air mover to maintain said positive pressure differential.

24. The evaporative heat exchanger of claim 19, wherein at least one of said air movers operates with variable speed control, and other flow control devices, to maintain desired air flow quantities for said portion of said first airstream and said remainder of said first airstream.

25. The evaporative heat exchanger of claim 1, wherein said parallel plates are formed from a plastic sheet material, the edges of said plates are formed to provide openings and closures for desired air entry and discharge patterns, and the planes of said plates include a pattern of formed projections that maintain desired spacings between the parallel plates.

26. The evaporative heat exchanger of claim 25, wherein said plates comprise plate pairs formed from a single plastic sheet with a 180 degree center fold and wherein said center fold forms a closed top edge to prevent water leaving said distribution system from entering said dry passages.

27. The evaporative heat exchanger of claim 1, wherein said plates further include formed snaps for securing adjacent plates while maintaining a desired parallel plate spacing dimension.

28. The evaporative heat exchanger of claim 1, wherein said plates further include formed turning vanes to smooth and distribute air flow.

29. The evaporative heat exchanger of claim 1, wherein said plates further include formed textured surfaces facing said wet passages.

30. The evaporative heat exchanger of claim 1, wherein said parallel plates are formed from plastic/paper sheet laminates, and said plastic pairs of said laminates face said dry passages, and said paper pairs of said laminates face said wet passages, to cause uniform wetting of the walls of said wet passages and thereby enhance evaporative cooling performance.

31. The evaporative heat exchanger of claim 20, wherein the at least one air mover operates with variable speed control to maintain equal flow rates for said first and second airstreams.

32. The evaporative heat exchanger of claim 20, wherein at the least one of said air mover operates with variable speed control to maintain a desired fixed flow rate for said first airstream under a range of pressure conditions.

33. The evaporative heat exchanger of claim 20, further comprising at least one first pressure sensor located at said dry passage lower side openings and at least one second pressure sensor located at the bottom edge wet passage, and wherein a positive pressure differential between said first and second sensors determines a variable speed of either said first air mover or said second air mover to maintain said positive pressure differential.

34. The evaporative heat exchanger of claim 20, wherein at least one of said air movers operates with variable speed control, and other flow control devices, to maintain desired air flow quantities for said portion of said first airstream and said remainder of said first airstream.